Claims

[c1] 1.A biodiesel fuel additive composition which accelerates combustion phenomenon, reduces ignition delay, improves Cetane number, and reduces particulate emissions while retaining or improving diesel engine performance comprising a mixture of: (a)a fuel conditioner component comprising:(i)from about 10 to about 70 weight percent, based upon the total weight of the additive, of a polar oxygenated hydrocarbon having an average molecular weight in the range of about 200 to about 500, an acid number in the range of about 25 to about 175, and a saponification number in the range of about 30 to about 250, and (ii)from about 10 to about 70 weight percent, based upon the total of the additive, of an oxygenated compatibilizing agent preferably having a solubility parameter in the range of about 7.0 to about 14.0 and moderate to strong hydrogen capacity.

[c2] 2.The biodiesel fuel additive composition according to Claim 1 is for use in biodiesel in an amount of from about 2% to about 100% by volume.

[c3] 3.The biodiesel fuel additive composition according to Claim 1, for use with a diesel fuel containing biodiesel in an amount of up to 50% by volume.

[c4] 4.The biodiesel fuel additive composition according to Claim 1, wherein said additive composition is added to the base fuel in an

amount of from about 50 ppm to about 500 ppm.

[c5] 5.The biodiesel fuel additive composition according to Claim 1, wherein said additive composition is added to the base fuel containing a detergent in an amount of from about 100 ppm to about 1500 ppm.

[c6] 6.The biodiesel fuel additive composition according to Claim 1, wherein said additive composition is added to the base fuel simultaneously with any other additives.

[c7] 7.The biodiesel fuel additive composition according to Claim 1, wherein said additive composition is added to the base fuel after any other additives have been added.

[c8] 8.The biodiesel fuel additive composition according to Claim 1, wherein said additive composition is added to the base fuel before any other additives are added.

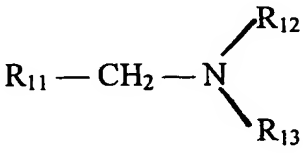
[c9] 9.A biodiesel fuel additive composition which accelerates combustion phenomenon, reduces ignition delay, improves Cetane number, and reduces particulate emissions while retaining or improving diesel engine performance comprising a mixture of:(a)from about 10 to about 90 weight percent, based upon the total weight of the additive, of a detergent component selected from the group consisting of(i)a reaction product of:(A)a substituted hydrocarbon of the

formula $R_1 - X$ (I)

[c10] wherein R_1 is a hydrocarbyl radical having a molecular weight in the range of about 150 to about 10,000, and X is selected from the group consisting of halogens, succinic anhydride and succinic dibasic acid, and(B)an amino compound of the formula $H-(NH-(A)_m)_n-Y-R_2$ (II)

[c11] wherein Y is O or NR_5, R_5 being H or a hydrocarbyl radical having 1 - 30 carbon atoms; A is a straight chain or branched chain alkylene radical having 1 - 30 carbon atoms; m has a value in the range of 1 - 15; n has a value in the range of 0 - 6; and R_2 is selected from the group consisting of H, a hydrocarbyl radical having a molecular weight in the range of about 15 to about 10,000, and a homopolymeric or heteropolymeric polyoxyalkylene radical of the formula $R_3-((Q)_a(T)_b(Z)_c)_d$- (III)

[c12] wherein R_3 is H or a hydrocarbyl radical having 1 - 30 carbon atoms, Q, T, and Z are polyoxyalkylene moieties having 1 - 6 carbon atoms, a, b and c each have values ranging from 0 - 30, and d has a value in the range of 1- 50, and(ii)a polybutylamine or polyisobutylamine of the formula



(IV)

[c13] where R_{11} is a polybutyl or polyisobutyl radical derived from isobutene and up to 20% by weight of n-butene and R_{12} and

R_{13} are identical or different and are each hydrogen, an aliphatic or aromatic hydrocarbon, a primary or secondary, aromatic or aliphatic aminoalkylene radical or polyaminoalkylene radical, a polyoxyalkylene radical or a heteroaryl or heterocyclyl radical, or, together with the nitrogen atom to which they are bonded, form a ring in which further hetero atoms may be present; and(b)a fuel conditioner component comprising:(i)from about 10 to about 70 weight percent, based upon the total weight of the additive, of a polar oxygenated hydrocarbon having an average molecular weight in the range of about 200 to about 500, an acid number in the range of about 25 to about 175, and a saponification number in the range of about 30 to about 250, and(ii)from about 10 to about 70 weight percent, based upon the total of the additive, of an oxygenated compatibilizing agent preferably having a solubility parameter in the range of about 7.0 to about 14.0 and moderate to strong hydrogen capacity.

[c14] 10.The biodiesel fuel additive composition according to Claim 9 is for use in biodiesel in an amount of from about 2% to about 100% by volume.

[c15] 11.The biodiesel fuel additive composition according to Claim 9, for use with a diesel fuel containing biodiesel in an amount of up to 50% by volume.

[c16] 12.The biodiesel fuel additive composition according to Claim 9, wherein said additive composition is added to the base fuel

simultaneously with any other additives.

[c17] 13.The biodiesel fuel additive composition according to Claim 9, wherein said additive composition is added to the base fuel after any other additives have been added.

[c18] 14.The biodiesel fuel additive composition according to Claim 9, wherein said additive composition is added to the base fuel before any other additives are added.

[c19] 15.The biodiesel fuel additive composition according to Claim 9, wherein said additive composition is added to the base fuel in an amount of from about 50 ppm to about 500 ppm.

[c20] 16.The biodiesel fuel additive composition according to Claim 9, wherein said additive composition is added to the base fuel containing a detergent in an amount of from about 100 ppm to about 1500 ppm.